

LUNAR PHASE EXERCISE

Purpose: to illustrate to you and your partner how the phases of the moon actually occur.

Materials: you, a partner, a golf ball, and your textbook.

Procedure:

Step 1: One partner will sit in a desk facing the front blackboard. This student will represent the earth and the board will represent the sun.

Step 2: The other partner must hold the golf ball so the white side always faces the sun (the board). This represents the idea that the moon's lit side always faces the sun and the dark side will always be away from the sun.

Step 3: The golf ball (which represents the moon) should be held at eye level, about two feet from the student representing the earth. Begin by putting the moon between the earth and the sun. This will be referred to as the 12 o'clock position and as position 1.

Step 4: Answer the questions about each position as you move the moon around the earth.

Questions from position 1: answer on a separate sheet of notebook paper.

1. Define moon phase.
2. Why does the moon go through phases?
3. Why does the sun not go through phases?
4. How much of the moon is always lit?
5. How much of the moon's lit side is visible to earth at position one?
6. Name this moon phase.
7. What time is it for the person on earth when this moon is at his zenith?
8. Draw the phase as it appears to the observer on the earth.

Step 5: Move the moon counterclockwise (from earth's view) about $\frac{1}{8}$ of a revolution. Remember to keep the white side facing the sun and at eye level for the person representing the earth. The earth should turn to face the moon. The moon's position should be equivalent to 10:30. This will be position number 2.

9. Does the earth see more or less of the lit up side as the moon moves from position 1 to position 2?
10. What name is given to phases during which more of the lit side is seen each night?
11. About what fraction of the moon's surface appears to be lit from the earth's point of view? (All, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$ or none)
12. Which side of the moon appears to be lit? (right, left, top, bottom) Is this the side toward the sun or away from the sun?
13. Name this phase and draw it as it appears in the sky.
14. What time is it on earth for an observer that has this moon at zenith?

Step 6: Move the moon again counterclockwise around the earth $\frac{1}{8}$ of a revolution. Be sure to keep the golf ball at eye level and the white (lit) side facing the board (the sun). The moon should now be at a 9:00 o'clock position and will be known as position 3. The person representing earth should turn and face the moon.

15. Is there more or less of the moon visible now than at position 2?
16. What term refers to more of the moon becoming visible?
17. How many days have passed from position 1 to position 3?
18. How much of the moon's surface facing earth is visible ? (all, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, or none)
19. Which side of the moon is visible? (right, left, top, bottom).
20. Name this phase and draw it. How much of its orbit has the moon completed?
21. What time is it for an observer that has this moon at his zenith?

Step 7: Move the moon another $\frac{1}{8}$ revolution around the earth. Keep the moon at eye level with the lit side toward the sun. The student representing earth should turn to face the moon. The moon should be in the 7:30 position and this is position 4.

22. Is the earth seeing more or less of the moon's lit side?
23. How much of the moon's surface facing earth is visible? (all, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, none)

24. Which side of the moon is lit? (top, bottom, left, right)

25. What is the name of this phase?

26. What time is it for an observer that has this moon at his zenith?

Step 8: Move the moon an additional $\frac{1}{8}$ revolution keeping it at eye level and the lit side facing the sun. The moon should be in the 6 o'clock position. This is position 5.

27. How much of the moon's side facing the earth is lit? (all, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, none)

28. What is the name of this phase?

29. How many days have passed since the new moon?

30. What time is it for an observer that has this moon at his zenith?

Step 9: Move the moon another $\frac{1}{8}$ orbit. It should be in the 4:30 position. Be sure to keep it at eye level with the lit side facing the sun. This is position 6.

31. Does the earth see more or less of the moon's lit side?

32. What is the name given to the phases in which the amount of the moon's lit side is getting smaller when viewed from earth?

33. How much of the moon's side facing earth is lit? (all, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, none)

34. Which side of the moon is lit? (top, bottom, right or left)

35. What is the name of this phase?

36. What time is it for an observer who has this phase at his zenith?

Step 10: Move the moon another $\frac{1}{8}$ of an orbit keeping it at eye level, the lit side facing the sun, and the student representing the earth, facing the moon. This should be the 3 o'clock position. This is position 7.

37. Does the earth see more or less of the moon's lit side from this position (7) than it did from position 6?

38. How much of the moon facing earth is lit? (all, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, none)

39. Which side of the moon is lit? (right, left, top, bottom)

40. What is the name of this phase?

41. What time is it for an observer who has this phase at zenith?

Step 11: Move the moon another $\frac{1}{8}$ orbit around the earth. Keep it at eye level with the lit side toward the sun (the blackboard). This should be in the 1:30 position and will be called position 8.

42. Does the earth see more or less of the moon's lit face.

43. How much of the moon facing earth is lit? (all, $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, none)

44. Which side of the moon is lit? (right, left, top, bottom)

45. What is the name of this phase?

46. What time is it for an observer who has this phase at zenith?

Other Questions

47. Name the phase that occurred when the moon came between the earth and the sun.

48. What kind of eclipse can occur during this phase?

49. Why does an eclipse not occur every new moon?

50. Name the phase that occurred when the earth was between the sun and moon.

51. What kind of eclipse occurs during this phase?

52. Why does an eclipse not occur every full moon?

53. It is a common misconception that the moon's phases are caused by earth's shadow falling on the moon. Explain why this cannot possibly be true.

54. Do the horns of the crescent moon point toward or away from the sun?

55. Explain why the moon is not visible every night even if the sky is clear.

56. Why is there no such thing as the dark side of the moon?

57. Explain why a star could never be visible between the horns of a crescent moon.

58. What time period originated from the amount of time over which a complete cycle of moon phases occur?

59. Which day of the week is named for the moon?

60. What major effect does the moon's gravity have upon the earth?